

of said repetition rate and said excitation frequency whereby to vary sequentially the mass-to-charge ratio of ions undergoing said resonant oscillatory motion.

5. (Amended) A method as claimed in [any one of claims] claim 1 [to 3] wherein the repetition rate of said time-varying rectangular wave voltage and the excitation frequency of said time-varying dipole excitation voltage have a fixed relationship and including scanning said repetition rate and said excitation frequency through a predetermined range whereby sequentially to cause ions having different mass-to-charge ratios to undergo resonant oscillatory motion.

6. (Amended) A method as claimed in [any one of claims] claim 1 [to 5] wherein said time-varying rectangular wave voltage is a frequency-variable square wave voltage.

7. (Amended) A method as claimed in [any one of claims] claim 1 [to 5] wherein said time-varying rectangular wave voltage has a DC offset.

8. (Amended) A method as claimed in [any one of claims] claim 1 [to 7] wherein said quadrupole ion trap device is an ion trap device capable of generating a 3-D quadrupole electric field.

9. (Amended) A method as claimed in [any one of claims] claim 1 [to 7] wherein said quadrupole ion trap device is an ion trap device capable of generating a 3-D quadrupole electric field and higher order multiple electric fields.

10. (Amended) A method as claimed in [any one of claims] claim 1 [to 7] wherein said quadrupole ion trap device is a linear quadrupole ion trap device.

11. (Amended) A method as claimed in [claims] claim 1 [to 10] wherein said resonant oscillatory motion is capable of causing selective ejection of ions from said quadrupole ion trap device for detection by an external detector.

12. (Amended) A method as claimed in [any one of claims] claim 1 [to 10] wherein said resonant oscillatory motion is capable of increasing the kinetic energy of ions trapped by the quadrupole ion trap device.

13. (Amended) A method as claimed in [any one of claims] claim 1 [to 12] wherein said time-varying dipole excitation voltage has multi-frequency components and is capable of exciting ions within a mass range and inducing image current for image current detection.

14. (Amended) A method as claimed in [any one of claims] claim 1 [to 13] wherein said time-varying dipole excitation voltage has a rectangular waveform and is also generated by controlling switches.

19. (Amended) An apparatus as claimed in [any one of claims] claim 16 [to 18] including means for fixing one of the repetition rate of said time-varying rectangular wave and the excitation frequency of said time-varying dipole excitation voltage and scanning another of said repetition rate and said excitation frequency whereby to vary sequentially the mass-to-charge ratio of ions undergoing said resonant oscillatory motion.

20. (Amended) An apparatus as claimed in [any one of claims] claim 16 [to 18] wherein the repetition rate of said time-varying rectangular wave voltage and the excitation frequency of said time-varying dipole excitation voltage have a fixed relationship and including means for scanning said repetition rate and said excitation voltage through a predetermined range whereby sequentially to cause ions having different mass-to-charge ratios to undergo said resonant oscillatory motion.

21. (Amended) An apparatus as claimed in [any one of claims] claim 16 [to 20] wherein said time-varying rectangular wave voltage is a frequency-variable square wave voltage.

22. (Amended) An apparatus as claimed in [any one of claims] claim 16 [to 20] wherein said time-varying rectangular wave voltage has a DC offset.

23. (Amended) An apparatus as claimed in [any one of claims] claim 16 [to 22] wherein said resonant oscillatory motion is capable of causing selective ejection of ions from said quadrupole ion trap device for detection by an external detector.

24. (Amended) An apparatus as claimed in [any one of claims] claim 16 [to 22] wherein said resonant oscillatory motion is capable of increasing kinetic energy of ions trapped by the quadrupole ion trap device.

25. (Amended) An apparatus as claimed in [any one of claims] claim 16 [to 22] wherein said time-varying dipole excitation voltage has multi-frequency components and is capable of exciting ions within a mass range and induce image current for image current detection.

26. (Amended) An apparatus as claimed in [any one of claims] claim 16 [to 25] wherein said time-varying dipole excitation voltage has a rectangular waveform and is also generated by controlling switches.

32. (Amended) A quadrupole ion trap device incorporating an apparatus as claimed in [any one of claims] claim 16 [to 27].

Please cancel claims 28-31.

28. (Cancelled)

29. (Cancelled)

30. (Cancelled)

31. (Cancelled)

Please add the following new claims:

33. (New) A quadrupole ion trap device as claimed in claim 32 being a 3D rotationally symmetric quadrupole ion trap device.

34. (New) A quadrupole ion trap device as claimed in claim 32 being a linear quadrupole ion trap device.